



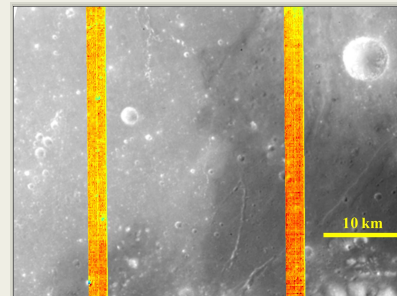
## Project Introduction

We are applying Geographic Information Systems (GIS) to new orbital data sets for lunar resource assessment and the identification of past habitable environments on Mars. GIS has not previously been used for planetary resource assessment and its applicability to martian habitability is in its infancy. NASA has recognized the interest in this technology with the recent establishment of a NASA-wide Enterprise Agreement with ESRI, the developers of ArcGIS. Lunar resource assessment is recognized as a key to future exploration and sustainability. The recognition of martian habitable environments is a top priority goal of NASA's Mars Program.

This is a one-year project to apply a GIS analysis tool to new orbital data for lunar resource assessment and martian habitability identification. We used ArcGIS, the state-of-the-art software for mapping, integrating, and analysis of spatial data. We focused on the assessment of several regional lunar pyroclastic deposits and habitability analysis in the Chryse-Acidalia portion of the martian lowlands. This work expands upon a previous 3-year project enabled through IRD funds. As a direct result of this project three scientific papers have been published: Allen, C.C., Greenhagen, B.T., Donaldson Hanna, K.L., and Paige, D.P. (2012) Analysis of lunar pyroclastic deposit FeO abundances by LRO Diviner, *Journal of Geophysical Research*, 117, E00H28, doi:10.1029/2011JE003982. Oehler, D.Z. and Allen, C.C. (2012) Giant polygons and mounds in the lowlands of Mars: signatures of an ancient ocean?, *Astrobiology*, 12, 1-15. Oehler, D.Z. and Allen, C.C. (2012) Focusing the search for biosignatures on Mars: Facies prediction with an example from Acidalia Planitia, in *Sedimentary Geology of Mars* (J.P. Grotzinger and R.E. Milliken, eds.), SEPM Special Publication No. 102, 183-194.

## Anticipated Benefits

Dr. Dorothy Oehler (co-investigator on this project) was selected as a Participating Scientist, in part because of GIS experience developed on this project.



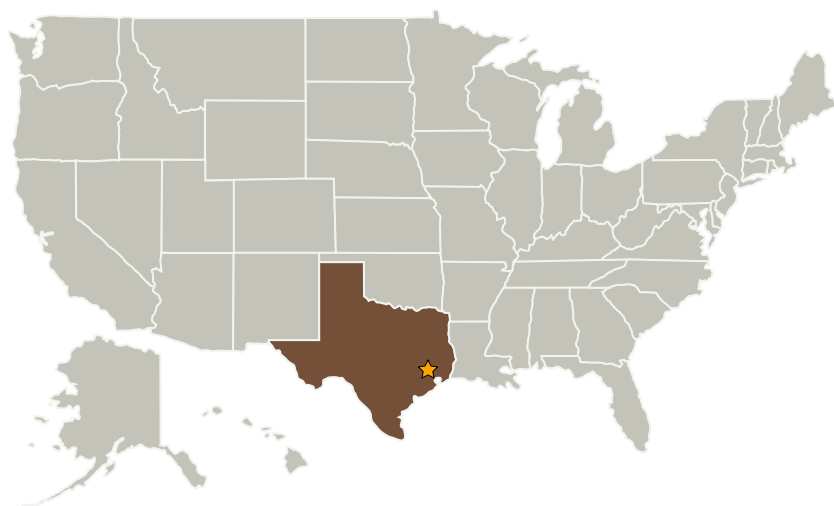
Project Image GIS Technology: Resource and Habitability Assessment Tool

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## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Jacobs Engineering Group, Inc.	Supporting Organization	Industry	Dallas, Texas

### Primary U.S. Work Locations

Texas

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Johnson Space Center (JSC)

### Responsible Program:

Center Innovation Fund: JSC CIF

## Project Management

### Program Director:

Michael R Lapointe

### Program Manager:

Carlos H Westhelle

### Project Manager:

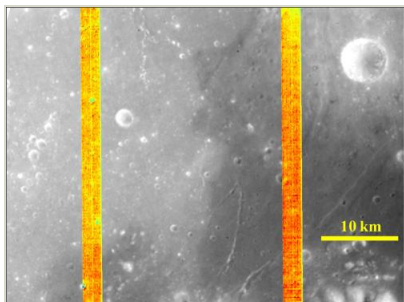
Carlton C Allen

### Principal Investigator:

Carlton C Allen

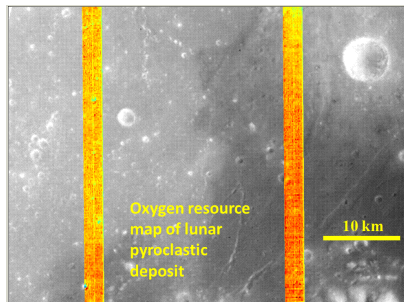


## Images



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Project Image GIS Technology:  
Resource and Habitability  
Assessment Tool  
(<https://techport.nasa.gov/image/2192>)

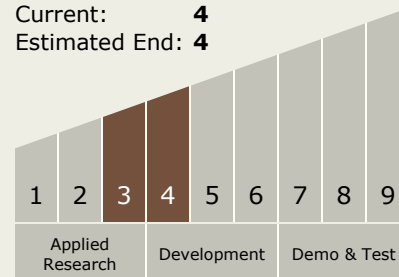


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Project Image GIS Technology:  
Resource and Habitability  
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(<https://techport.nasa.gov/image/2193>)

## Technology Maturity (TRL)

Start: **3**  
Current: **4**  
Estimated End: **4**



## Technology Areas

### Primary:

- TX07 Exploration Destination Systems
  - TX07.1 In-Situ Resource Utilization
    - TX07.1.1 Destination Reconnaissance and Resource Assessment